

## Section 3: Pollution and Recycling

### Preview

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- Bellringer
- What Causes Pollution?
- Air Pollution
- Major Air Pollutants in the US
- Water Pollution
- Pollution on Land
- Reducing Pollution

### Key Ideas

- › What does pollution look like?
- › What is air pollution made of?
- › What causes water pollution?
- › Where does land pollution come from?
- › How can we reduce pollution?

### Bellringer

1. Pollution has become a problem in the modern world.  
List three different types of pollution.
2. Describe ways to reduce each type of pollution you listed above.
3. Name some reasons why recycling efforts fail.

### What Causes Pollution?

- › What does pollution look like?
- › Pollution can be as imperceptible as a colorless, odorless gas or as obvious as bad-smelling trash left by the side of the road.
- **pollution**: an undesirable change in the natural environment that is caused by the introduction of substances that are harmful to living organisms or by excessive wastes, heat, noise, or radiation

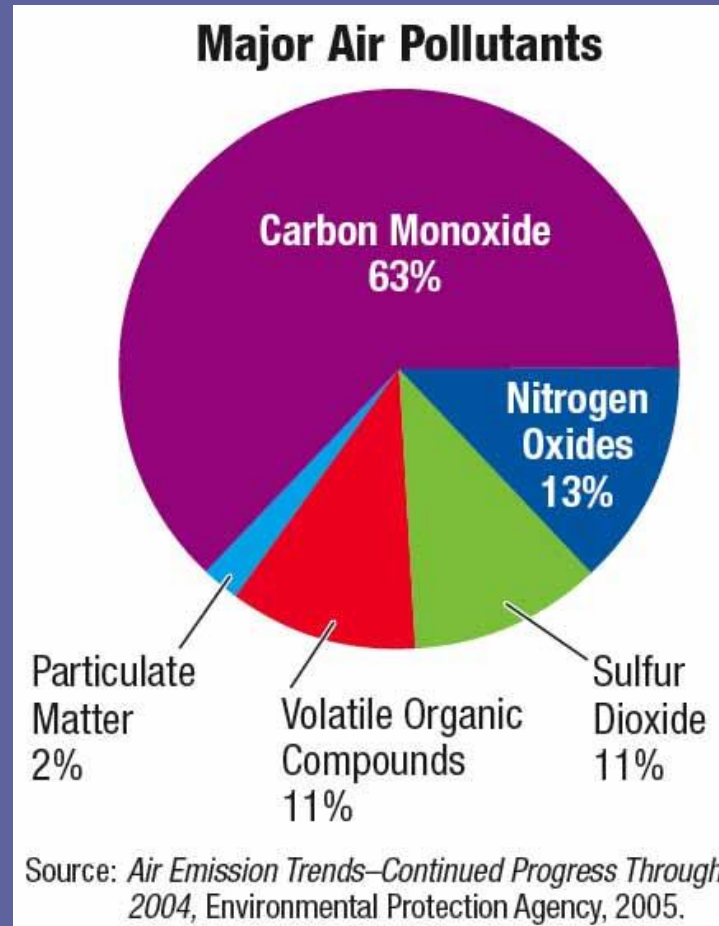
### What Causes Pollution? *continued*

- Some pollution has natural causes.
  - An explosive volcanic eruption can spread dust and ash into the air.
  - Animal waste can also become a pollutant if it is produced faster than it can be assimilated back into the environment.
- Manmade pollution is more common.
  - Most pollution is caused by human activities.

### Air Pollution

- › What is air pollution made of?
- › Air pollution comes in many forms, from individual molecules to particulates, which are clumps of dust and other matter.

# Major Air Pollutants in the US



### Air Pollution, *continued*

- Combustion of fuels produces most air pollution.
  - The burning of fossil fuels produces carbon dioxide and water vapor.
- Carbon dioxide is a greenhouse gas.
  - Carbon dioxide is found naturally in the environment.
  - Carbon dioxide traps the sun's radiation, helping keep the Earth warm.
  - Too much carbon dioxide may cause global warming.
- **global warming**: a gradual increase in the average global temperatures



# Visual Concept: Global Warming



### Air Pollution, *continued*

- Burning fossil fuels can cause acid precipitation.
  - The burning of fossil fuels also releases sulfur dioxide and nitrogen dioxide.
  - These gases react to produce acids.
  - The acids in the atmosphere fall to Earth as acid precipitation.
  - Acid precipitation can harm wildlife and corrode stone and metal.

### Air Pollution, *continued*

- Air pollution can cause breathing problems.
  - Nitrogen oxide and ozone along with other chemicals react with sunlight and produce *photochemical smog*.
  - Photochemical smog can cause breathing difficulties and damage plants.
  - Many cities have expanded public transportation to reduce the amount of air pollution being produced.

### Water Pollution

- › What causes water pollution?
- › Most water pollution can be traced to industrial waste, agricultural fertilizers, and everyday human activities.
  - All living things need water to survive.
  - Cleaning up water pollution is extremely difficult.
  - In most countries water is purified, but it is difficult to remove all contaminants.

### Water Pollution, *continued*

- Fertilizer runoff can pollute water.
  - Fertilizers cause too much algae and bacteria to grow in an aquatic environment.
  - As the increased algae dies and decays, the amount of dissolved oxygen in the water decreases.
  - Aquatic wildlife and fish suffocate in these reduced oxygen environments and die.
- **eutrophication**: an increase in the amount of nutrients, such as nitrates, in a marine or aquatic ecosystem

### Water Pollution, *continued*

- Pesticides can affect more than just insects.
  - Pesticides can be washed by rain into streams, rivers, and lakes.
  - There, pesticides are ingested by fish and other aquatic animals.
  - As larger animals eat the fish, the chemicals are passed along the food chain.

### Pollution on Land

- › Where does land pollution come from?
- › Land pollution has many sources. Some of these are obvious, but others may be hard to pinpoint.

### Pollution on Land, *continued*

- Contaminants in soil are hard to remove.
  - Trash and hazardous chemicals can pollute soil.
  - Chemicals that do not dissolve are very difficult to remove from soil.
  - Dioxin is a chemical pollutant derived from paper-making that can contaminate soil and cause cancer.



### Reducing Pollution

- › How can we reduce pollution?
- › Pollution can be reduced through the protection and conservation of resources.
  - Laws are one way to help reduce pollution.

### Reducing Pollution, *continued*

- Choosing alternatives often involves trade-offs.
  - There are many ways to reduce or limit pollution.
  - Choosing alternative energy resources are one way to reduce some forms of pollution.
  - Using reusable batteries and solar-powered devices can also help reduce pollution.

### Reducing Pollution, *continued*

- Reducing the use of energy and products can cut down on pollution.
  - Some ways to reduce pollution are:
    - turn off lights when not in use
    - carpool or use public transportation
    - use rechargeable batteries
    - use water from laundry and dishes for gardens and lawns
    - buy reusable instead of disposable products

### Reducing Pollution, *continued*

- Recycling is another way to prevent pollution.
  - Recycling allows materials to be used again to make other products rather than being thrown away.
  - Many cities recycle paper, metal and plastic.
  - We currently recycle less than 30% of our paper waste.
- **recycling**: the process of recovering valuable or useful materials from waste or scrap, or reusing some items

# Visual Concept: Recycling

